DEVELOPMENT OF WORKING AT HEIGHT MANAGEMENT SYSTEM BASED ON LEGISLATIONS IN MALAYSIA

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis/project and in my opinion, this thesis/project is adequate in terms of scope and quality for the award of the degree of Bachelor's in Occupational Safety and Health with Honours.

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Industri pembinaan merupakan salah satu industri yang berbahaya di Malaysia kerana terdapat risiko tinggi berlakunya kemalangan. Di antara kemalangan yang kerap berlaku di tapak pembinaan adalah pekerja mungkin akan terdedah kepada kemalangan seperti jatuh dari tempat tinggi. Walaupun kerajaan Malaysia telah mengambil tindakan untuk mengurangkan bilangan kemalangan dari segi undang-undang, tetapi kemalangan di industri pembinaan masih pada tahap peringkat yang membimbangkan, terutamanya kemalangan yang melibatkan aktiviti bekerja di tempat tinggi. Untuk mengatasi masalah ini, sistem pengurusan bekerja di tempat tinggi akan diciptakan untuk membantu syarikat-syarikat pembinaan terutamanya kontraktor perusahaan kecil dan sederhana untuk membantu mereka menguruskan pematuhan keperluan undang-undang Peraturan BOWEC 1986, FMA 1976 dan OSHA 1994 dari segi aktiviti bekerja di tempat tinggi. Keperluan undang-undang akan diambil dari ketiga-tiga peraturan tersebut untuk aktiviti bekerja di tempat tinggi (Objektif). Tahap kebolehgunaan sistem pengurusan ketinggian ini akan disahkan dengan menggunakan kajian kes sebenar iaitu menggunakan satu projek pembinaan bangunan. Selain itu, pengamal keselamatan juga telah ditemu bual untuk mengesahkan kebolehgunaan undang-undang terhadap aktiviti bekerja di tempat tinggi (Kaedah). Hasilnya, keperluan undang-undang bekerja di tempat tinggi dan prototaip telah digunakan oleh pengamal keselamatan daripada industri pembinaan untuk memeriksakan prestasi pematuhan undang-undang projek pembinaan (Keputusan). Sistem pengurusan bekerja di tempat tinggi ini terbukti bahawa system ini dapat membantu pengguna untuk menyimpan dokumen serta memeriksa tahap pematuhan keperluan undang-undang bekerja di tempat tinggi secara sistematik. (Keputusan). Pelaksanaan sistem ini boleh menyumbang kepada kesedaran mematuhi peraturan-peraturan dan meningkatkan amalan kerja selamat dan sihat yang baik.

ABSTRACT

Construction industry is one of the top dangerous industry in Malaysia because there is a high risk of accident occurrence where the construction workers are exposed to accidents such as fall from height. The awareness of safety at workplace in Malaysia has emerged since 1967 with the introduction of the Factories and Machinery Act (FMA), followed by Building Operation and Works of Engineering Construction Regulations (BOWEC) in 1968 and Occupational Safety and Health Act (OSHA) in 1994 and Malaysian government has taken a lot of effort to reduce the number of accidents by legislations, but the construction-related accidents are still at high number especially working at height. Due to concern of this problem, a working at height management system will be developed to help the construction companies especially small medium enterprise contractors to help them to manage the compliance of legal requirements from BOWEC Regulations 1986, FMA 1976 and OSHA 1994 in terms of the working at height where such legal requirements will be taken from these three legislations for working at height activity only. The validity of the working at height management system, real case study was used by using a building construction project and interview was conducted with a safety practitioner to validate the working at height legal requirements. As a result, the working at height legal requirements and the prototype were used by a safety practitioner from construction industry to cross-check for compliance and to validate them as well. The developed working at height management system systematically help the end users to store their documentations, check compliance with working at height legal requirements from their inspection checklist and generate reports. The implementation of this system can contribute awareness of complying with the regulations and enhance their safety and health work practices.

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LIST OF ABBREVIATIONS

GDP	Gross Domestic Product
SOCSO	Social Security Organization
OSHA	Occupational Safety and Health Administration
OSHA	Occupational Safety and Health Act
DOSH	Department of Occupational Safety and Health
FMA	Factories and Machinery Act
BOWEC	Building Operations and Works of Engineering
IMIS	Integrated Management Information System
ASR	Accident Severity Rate
AFR	Accident Frequency Rate
PPE	Personal Protective Equipment
NIOSH	National Institute of Occupational Safety and Health
OSH	Occupational Safety and Health
PSI	Process Safety Information
PSM	Process Safety Management
QR	Quick Response
WAH	Working at Height
NADOPOD	Notification of Accidents, Dangerous Occurrence, Occupational Poisoning and Occupational Disease

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter covers the background of study, problem statement, research questions, objectives, research hypothesis, scope of study, significance of study, expected result, and conceptual framework.

1.2 Background of Study

The construction industry plays a big role in the development process of a country where successful development would contribute towards the economic growth generating additional demands for construction activities. In most industrialized countries, the construction industry is one of the most significant industries in terms of contribution to gross domestic product (GDP) but it also has a significant impact on the health and safety of workers which makes the construction industry is both economically and socially important (Yoon et al., 2013). The construction sector is a very important and productive sector for the Malaysian economy. As a developing nation, the role of the construction sector in Malaysia not only contributing in economic growth but also in improving the quality of nation lives where has been contributing between 3 to 5 percent of the aggregate economy GDP over the last two decades (Khan et al., 2014).

In Malaysia, the construction industry is one of the industries that plays an important role in generating job opportunity and economic growth. Despite of achieving the economic growth, this growing industry also has been categorized as one of the top dangerous industries due to increasing in number of accidents and fatalities, as reported by Social Security Organization (SOCSO). According to a SOCSO report in 2017, the average incident rate for fatalities was 12.2 accidents per 100 000 workers in construction

industry making this industry to be the one of the dangerous industries in Malaysia (Bakar, 2017). The average incidence rate for fatalities of construction industry of other countries is much lower compared to Malaysia. The average incidence rate for fatalities of Norway, United States of America and United Kingdom in 2016/17 was 4.1 per 100,000 workers, 3.6 per 100,000 workers and 1.37 per 100,000 workers respectively (National Occupational Health and Safety Commission, 2004). These developed countries prove that they are committed to practice good safety culture to reduce the rate of fatality.

Table 1.1 shows the percentage of number of fatalities reported for construction to the total fatalities of industry in Malaysia from the year of 2012 until 2017 (October). As calculated, the rate of fatality of the construction industry increases every year from 35.1% in the year of 2012 to 44.4% in the year of 2016. The percentage of fatality rate had increased by 9.3% dramatically. This is a huge increment in just a short span of 4 years. The rate of fatality of construction industry in the year of 2017 has not yet to be updated by DOSH and the percentage of fatality rate is 30.6%. However, this proves that the construction industry has the highest percentage of fatalities rate in Malaysia.

Table 1.1 The percentage of number of fatalities reported for construction industry to the total fatalities of industry

Year	**Number of fatalities from construction industry**	**Total number of fatalities for all type of industry**	**Percentage (%)**
2012	67	191	35.1
2013	69	185	37.3
2014	72	206	35.0
2015	88	214	41.1
2016	106	239	44.4
2017 (October)	63	296	30.6

Source: DOSH (2017)

In almost every country around the world where the amongst of all industries, the construction industry seems to be the one with highest rating of work-related injuries and deaths. Occupational Safety and Health Administration (OSHA) of United States stated the top four causes of fatalities in construction which are falls, being stuck by equipment or machineries, electrocution, and caught in between equipment (OSHA, 2007). This industry has been studied by a lot of researchers and most of the studies conducted by the researchers share the same findings in which the construction-related accidents are more

likely to happen when there are inadequate company policies, unsafe practices, and poor attitudes of construction personnel, poor management commitment and insufficient safety knowledge and training of workers.

Generally, the construction industry is a dangerous industry because there is a high risk of accident occurrence where construction workers are exposed to accidents such as falling from heights, movement of plant and machinery, electrical shocks, excessive noise and others (Ghazali et al., 2014). Most occupational fatalities occur in construction sites is due to fall from height. Fall from height is the number one accident type which contributed to workplace fatalities in the construction sector for the period (Nadhim et al., 2016). Fall from height accident is mainly due to fall from scaffolds, fall from platform, fall from ladder, fall from roof and fall from aerial lifts (Xinyu & Jimmie, 2003).

Based on the fatalities report provided by Department of Occupational Safety and Health (DOSH) Malaysia as shown in the Table 1.2, there are 16 fatalities cases related to fall from height from 2016 to 2018. A study was conducted on Malaysia's construction industry showing that the five major factors that are contributing to construction fall accidents are due to construction tools and equipment, workers factors, unsafe actions, unsafe conditions and management factors (Hanapi et al., 2013). Therefore, fall from height can be classified as a major problem at construction accidents in Malaysian construction industry (Samuel, 2017).

Table 1.2 The Fatalities Accident Case for Falling from Height

Date	**Details**	**Causes**
20-04-2018	Victim was at roof passing PVC and died from falling from height of 10 meters.	No safe working procedure for working at height No HIRARC No Safety and Health Officer
09-01-2018	Worker died due to falling from level 3 and crushed by concrete and scaffolding	No safe working procedure. No supervision and poor stability of structures.
22-03-2017	A carpenter was stripping formwork and fell from 4 meters height and died.	Not available.
11-03-2017	Worker was hit by a crane and died from falling from height	Unsafe working condition
22-02-2017	Worker fell from 7th floor during formwork installation and died.	Walls opening was not covered. Fail to provide access/working platform

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